

PUBLIC HEALTH ASSESSMENT

*Tucson International Airport Area Superfund Site
Tucson, Pima County, Arizona*

CERCLIS #AZ0980737530



Prepared by

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Executive Summary

The purpose of this document is to summarize the body of environmental health investigation work that has been developed for the TIAA site. The report includes a summary of previous reports and new data.

Contaminated groundwater was discovered in the area in 1981. The pollution included trichloroethylene (TCE). Investigations revealed the TCE was moving in a north to northwest direction.

TCE was also discovered in production wells used by Tucson Water in 1981. These wells were shut down shortly after the contamination was discovered. No groundwater data exist prior to 1981. Since historical exposure levels are unknown prior to 1981, exposure to contaminated groundwater posed an unknown public health hazard. Municipal groundwater posed no public health hazard after the contaminated municipal wells were closed.

There is currently no exposure of public health concern. However, no regulation prevents persons from installing private drinking water wells in the contaminated groundwater. Because the pollutants in the groundwater may be of public health concern if it were used for drinking water, the site may pose a potential public health hazard unless actions are taken to prevent such use.

1.0 Introduction

The Tucson International Airport Area Superfund Site (TIAA) is located on the southside of

Tucson, Arizona. The site is approximately bounded by Valencia Road on the north, Hughes Access Road to the east and south, and Highway 89 to the west (as shown in Figures 1 and 2). In May 1981, contaminated groundwater was discovered beneath part of the site, beginning a number of investigations evaluating the nature and extent of contamination in the area. From these investigations, at least three separate areas of contamination, potentially from different sources, have been identified. The Tucson International Airport Area (TIAA) Superfund Site was officially added to the National Priorities List (NPL) in 1983.

Various environmental sampling reports and health evaluations have been conducted over the years (for example - Hargis & Montgomery, 1982; PCDEQ, 1994; D.B. Stephens, 1995; Baseline Risk Assessment ADHS, 1996; ATSDR, 2000a; ATSDR, 2000b; ATSDR, 2000c). In addition to reports focusing on individual areas of contamination, the Agency for Toxic Substances and Disease Registry (ATSDR) released a Public Health Assessment (PHA) for the TIAA in 1988 and a draft version of a subsequent Public Health Assessment Addendum for the TIAA in 1996.

This document is prepared by the Arizona Department of Health Services (ADHS) in cooperative agreement with the ATSDR to incorporate past public comments and the most recent data available in evaluating the public health risks posed by the TIAA site. Public comments submitted to ATSDR regarding the 1996 Public Health Assessment Addendum (ATSDR, 1996a) have been reviewed and incorporated into this document where pertinent.

Because this current document is able to make use of a substantial body of public health evaluations previously unavailable, it is laid out differently than the 1996 ATSDR document. This PHA is essentially a new document (rather than a revised version of a previous document), and is being issued in draft form for public comment before being finalized.

1.1 Purpose

The purpose of this document is to summarize the body of environmental health investigation work that has been developed regarding the TIAA site. The report includes data available since previous documents were created, and develops and presents the overall public health findings for the TIAA site based on the current body of available data.

1.2 Background

Site Description and History

The Tucson Airport and surrounding area has been the site of various aviation, aerospace, and industrial facilities that have occupied portions of the site since 1942. The TIAA site includes one main contaminated groundwater plume with smaller areas of groundwater contamination located east of the main plume. Areas of contaminated soil have also been identified as part of the site. Figures 1 and 2 show the location of the site and specific areas mentioned in this text.

Approximately 20 facilities have operated at various times in the TIAA vicinity. Known waste

handling activities related to the TIAA site consisted of:

- ◇ surface discharge of waste liquids, containing several organic compounds, into soils, disposal ponds, and unlined landfills, and
- ◇ burning of wastes for use in fire training exercises (flammable wastes ignited in unlined fire pit areas, followed by application of water to extinguish the blaze).

Main Plume Area

In May 1981 contaminated groundwater was discovered at the site beneath Air Force Plant No. 44 (AFP44), which was operated for the Air Force at that time by Hughes Aircraft Corporation. This area is currently operated by Raytheon Corporation. Further investigations of the site revealed a sizable area of groundwater contamination, called the main plume, containing several organic compounds, including trichloroethylene (TCE), and chromium. Investigations revealed the contaminated groundwater plume was moving off-site in a north to northwest direction.

In 1987, the area of the plume was approximately 4 miles long and 3000 feet wide covering an area located from the northwest corner of the AFP44 facility to near Irvington Road (see Figure 1). A cooperative agreement between the USEPA and the United States Air Force (USAF) divided the plume into two major remedial areas with Los Reales Road as the dividing point. The portions of the main plume south of Los Reales Road are treated with a reclamation well field and full-scale air stripping facility that began operation in 1987 at the AFP44 site. North of Los Reales Road, the main plume is contained by extraction wells which feed the Tucson Aquifer Remediation Project (TARP) plant. Figure 2 displays a recent overview of the main plume showing the effect of remedial work in the AFP44 area over the last several years.

Plume B Area

East of the main plume are smaller areas of contamination indicated by soil and water quality analyses from sampling programs conducted in the TIAA area. Based on the analyses conducted to date and a review of historical activities at the facilities in the area, the contamination (primarily TCE and chromium) may have resulted from operations of any of the following: the Tucson Airport, the Burr-Brown facility, the former West Cap property, and the Arizona Air National Guard. In this report, these smaller areas of contaminated groundwater have been collectively referred to as "Plume B." The Plume B area is the subject of a separate Public Health Assessment (ATSDR, 2000c).

Other Areas

In addition to the areas of groundwater contamination, areas of soil and sediment contamination related to surface water runoff from the site were also identified during site investigations. A primary area was associated with the "Three Hangars" area of the airport. The Three Hangars area has been used for aircraft modification operations, general aircraft and vehicle maintenance, synthetic rubber and plastics manufacturing, charter services, and other industrial activities. Soil contaminated by runoff from this area has been discussed in a recent Public Health Assessment

subtitled “El Vado Residential Properties”(ATSDR, 2000a).

1.3 Site Visits

In addition to numerous site visits, ADHS also obtained information about the area from the ATSDR, the Pima County Department of Environmental Quality (PCDEQ), Arizona Department of Environmental Quality (ADEQ), U.S. Environmental Protection Agency (EPA), and from residents who attended numerous community meetings over the last several years.

Additional groundwater data were obtained from the TCE library located at the El Pueblo Community Center in south Tucson. The TCE library collects data and information that are provided by various governmental and community sources relating to the TIAA Superfund Site. This information is available to the public at the TCE Library located at 101 W. Irvington, Tucson, Arizona.

1.4 Demographics, Land Use, Natural Resources

Demographics and Land Use

The area around the TIAA is an area of mixed commercial and residential usage. Areas closest to the airport tend to be more commercial than areas slightly further from the airport. The greatest concentrations of residences are west and north of the airport. Approximately 55,000 people live within one mile of the site (1990 census). Figure 3 presents a map displaying general population characteristics in the vicinity of the TIAA site.

Natural Resources

Climate

The climate of Tucson, Arizona is semi-arid with an average of between 10 and 11 inches of rainfall annually. Annual evaporation is about four times greater than the average annual precipitation. Summertime high temperatures average about 100 degrees Fahrenheit. Winter high temperatures average in the upper 60s.

Water Resources

Most of the residential community obtains their water supply from the Tucson municipal water system. However, there are some residences in the area which still use private wells for drinking or irrigation purposes. Surface water is not a significant source of water supply in the Tucson area.

Natural surface waters in the site area are intermittent and occur primarily as runoff from storm events. The Airport Wash is the dominant surface water feature at the Tucson Airport, and is located in the northeastern part of the airport. The other major surface water feature consists of the Diversion Channel, which flows from Aero Park Road to the Hughes Access Road on the western side of the main runway. Under current land use conditions, artificial surface coverings

including pavement and tarmacs essentially prevent soil or groundwater contaminants from coming into contact with surface water. These coverings do allow the potential for surface water runoff to contaminate soils in areas where surface waters pond during storm events.

Geology

The upper 200 feet of sedimentary materials within the area show a general coarsening trend from east to west. Predominately fine-grained material is interbedded with layers and lenses of sand and gravel in a complex manner exist east of the Nogales Highway (PCDEQ, 1998).

General Hydrogeology

The regional aquifer system at the TIAA site is hydrogeologically complex due to lateral and vertical lithologic changes. Three units of the regional aquifer system (the upper zone, lower zone, and undivided regional aquifer) are present within the boundaries of the TIAA Site. The middle aquitard divides the regional aquifer into upper and lower zones under most of the TIAA Site.

Transport and fate of groundwater contamination has been associated mainly with the upper zone regional aquifer. The vertical extent of contamination has been limited by the presence of the middle aquitard. In this area, the upper zone regional aquifer is about 70 - 100 feet thick, extending from the water table, which occurs at depths of about 85 - 100 feet below the ground surface (bgs), to the top of the middle aquitard at a depth of about 175 feet bgs. As a consequence of the heterogeneous geology and groundwater pumpage, the depth to groundwater, nature of the aquifer system (unconfined versus confined), and direction of groundwater flow vary within the area depending on location and depth (PCDEQ, 1998).

1.5 Health Outcome Data

Several health studies have been conducted over the past 15 years to determine the health effects to residents in the TIAA area from exposures to trichloroethylene (TCE) in drinking water. Although these studies focus on exposures to TCE in drinking water primarily from the larger Main Plume, they are also applicable to the Plume B area since it also is contaminated with TCE and chromium similar to the Main Plume (ADHS, 1996; ATSDR, 1994). In many cases, the studies included participants or databases which covered both areas. These studies are as follows:

- ◇ *Mortality Rates on Tucson's Southside. Caldwell G. ADHS. 1986.*
- ◇ *An Association of Human Congenital Cardiac Malformations and Drinking Water Contamination. Goldberg SJ, Lebowitz MD, Graver EJ, Hicks S. Journal of the American College of Cardiology. 1990; 16;1:155-164.*
- ◇ *Maricopa and Pima County Birth Defects Study. ADHS. 1987.*
- ◇ *A Comparison of Homebound Program Admission Rates in the Tucson Unified and Sunnyside School Districts. K. Komatsu, ADHS. 1986.*

- ◇ *Historical Prospective Mortality Study of Hughes Aircraft Employees at Air Force Plant #44. ENSR. 1990.*
- ◇ *The Incidence of Childhood Leukemia and Testicular Cancer in Pima County, 1970-1986. ADHS. 1990.*
- ◇ *Effects on Neurobehavioral Performance of Chronic Exposure to Chemically Contaminated Well Water. Kilburn KH, Warshaw RH, University of Southern California, Los Angeles, CA. 1994.*
- ◇ *Prevalence of Symptoms of Systemic Lupus Erythematosus (SLE) and of Fluorescent Antinuclear Antibodies Associated with Chronic Exposure to Trichloroethylene and other Chemicals in Well Water: Kilburn KH, Warshaw RH. Environmental Research. 1992; 57:1-9.*

These studies have been summarized and discussed in previous documents (ATSDR, 1996a; ATSDR, 2000c) and the reader is referred to those documents for further interest. A brief summary of the findings from these is found in Section 4.3, “Health Outcome Data Evaluation.”

Other available Health Outcome Data include a Disease and Symptom Prevalence Survey for part of the TIAA site area conducted by ATSDR (ATSDR, 1996b), and information emerging from the ongoing National Exposure Registry - Trichloroethylene (TCE) Subregistry developed by ATSDR (see ATSDR, 1999 for a recent summary report of the Registry program). Information from these projects is discussed in Section 4.3, “Health Outcome Data Evaluation.”

2.0 Community Health Concerns

This section describes general concerns voiced by community residents who live near the TIAA site. Detailed descriptions of these concerns have been documented in previous reports (ATSDR, 1988; ATSDR, 1996a; ATSDR, 2000c). These concerns have already been discussed in detail in the 1996 PHA Addendum (ATSDR, 1996a).

Groundwater contamination in southwest Tucson has been a concern of residents living near the TIAA site for many years. The community includes many residents who understand the history of the site, the exposure scenarios, and what is happening with the remediation activities. Some believe that public drinking water is still contaminated. While many residents have switched over to City water, a few believe that drinking water out of a contaminated private well is safer than drinking the “contaminated Tucson Water” and have chosen not to hook up to city water (ATSDR, 2000c; PCDEQ, 1998). ADHS has made recommendations in previous documents (ATSDR, 2000c) to address potential exposure due to use of private wells.

In the past, residents in southwest Tucson have expressed concerns about the prevalence of congenital heart disease, lupus, and, cancer in their community that they associate with exposure

to the contaminated groundwater (ATSDR, 1988, 1996a). Several studies have been conducted to address these concerns, as described in Section 1.5, “Health Outcome Data,” and Section 4.3, “Discussion: Health Outcome Data Evaluation.”

In addition, former workers from the AFP44 facility have expressed concerns about potential workplace exposures. ADHS was unable to locate environmental data to evaluate past conditions inside the facility. Investigations of workplace health concerns are the authority of the Occupational Safety and Health Administration (OSHA) and the Arizona Industrial Commission -Occupational Safety and Health Division, and are beyond the scope of this report.

3.0 Environmental Contamination and Other Hazards

In this section, contamination in the site area will be discussed based on the medium (air, soil, water) and where the chemicals are, or have been, found. For issues which have been addressed by previous documents, the reader will be referred to those documents for detailed discussion.

3.1 Data

Air

No air sampling data were located for public exposures in the site area. No significant air exposure pathway appears likely based on site contaminants and conditions and past public health evaluations did not find a need for any air sampling (ATSDR, 1988, 1996a). On-site soil gas samples have been collected and evaluated for part of the site (ATSDR, 2000b). The available data are discussed in section 4.1 “Environmental Data Evaluation.”

Soil

Evidence of past off-site soil contamination related to drainage system runoff from the TIAA site has been detected. This contamination was evaluated in the PHA document subtitled “El Vado Residential Properties” (ATSDR, 2000a). Other areas of contaminated soil were found onsite and are discussed in section 4.1, “Environmental Data Evaluation.”

Water

As noted previously, no significant perennial surface waterways exist in the TIAA site area, and surface water is not considered to be a pathway of public health significance. However, the site has multiple areas of significant groundwater contamination associated with it, and groundwater is the main source of drinking water supply for the TIAA site area. For ease of discussion, groundwater contamination will be discussed in separate detail for the past and present timeframes.

Past Groundwater Data

Past groundwater conditions have been evaluated for the time period 1981 to 1999 in previous documents (ATSDR, 1988, 1996a, 2000c). No sampling data were located which indicate groundwater chemical conditions prior to 1981. ATSDR (1996a) did evaluate scenarios to

estimate potential levels of groundwater contaminants prior to 1981 in the draft PHA. However, comments on that draft text indicated that the model oversimplified the complex hydrogeology of the site. ATSDR's text accompanying the modeling effort also indicated that the estimates were only for purposes of estimating approximate dates of contamination in wells and that the numbers should not be used to evaluate public health exposures. In addition, ADHS notes that the definition of multiple distinct areas of contamination (e.g., Main Plume and Plume B) is more complex than the model effort incorporated. Based on these comments, ADHS finds the existing database inadequate to evaluate groundwater exposures prior to 1981. The ADHS could not locate any actual data or detailed estimates suitable for use in public health evaluation of groundwater contaminant concentrations prior to 1981.

Present Groundwater Data

Groundwater sampling of the two plumes associated with the site continues at present. ADHS' most recent evaluation of this data was published in 2000 (ATSDR, 2000c). Additional data on groundwater conditions are routinely reported by USEPA and AFP44. These data are publicly available from USEPA or at the TCE Library at 101 W. Irvington, Tucson. USEPA drinking water regulations also require the Tucson Municipal Water authority to notify customers if any of the municipal drinking water is not meeting EPA standards for maximum contaminant levels. Current data indicate local drinking water contains less than 5 ug/l of TCE.

4.0 Discussion

ADHS evaluates a site by considering the level of exposure in potential or completed exposure pathways. An exposure pathway is the way chemicals may travel through the environment and enter a person's body to cause a health effect. It includes all of the steps between the release of the chemical and the population exposed: (1) a chemical release source, (2) chemical movement, (3) a place where people can come into contact with the chemical, (4) a route of human exposure, such as an inhalation or ingestion, and (5) a population that is exposed. ADHS considers which chemicals, if any, from a site are present at levels of public health concern (i.e., above an appropriate comparison value) through all five elements of a completed pathway when determining the public health implications of a site.

4.1 Environmental Data Evaluation

This section presents ADHS' evaluation of the available data based either on data listed in the section titled "Environmental Contamination" or on previously published reports as identified in the text.

Air

No data were found indicating large-scale chemical releases to the air which would affect the ambient air around the Tucson International Airport Area site. Limited data from a portion of the site were evaluated (ATSDR, 2000b) and are summarized in Table 1. Based on the limited available data, activities conducted at the TIAA site, and the nature of the soil and groundwater

contamination, ADHS does not find any public health issues from ambient air exposures to site-related chemicals for either the past, present, or future timeframes.

Table 1: Maximum Contaminant Concentrations of On-Site Soil Gas Samples, Modeled Indoor Air Concentrations and ATSDR's Air Comparison Values.

Contaminant	Concentration Range in Soil Vapor ($\mu\text{g/L}$) [†]	Maximum Concentration in Samples ($\mu\text{g/L}$)	Modeled Air Concentration ($\mu\text{g/L}$)	ATSDR Air CV [‡] ($\mu\text{g/L}$)	Exceed ATSDR CV?
TCE [§]	ND [¶] - 111	111 ^b	6.5E-06	5.5E+02 ²	NO
PCE ^{**}	ND - 28.7	28.7 ^b	2.1E-06	2.8E+02 ¹	NO
1,1-DCE ^{††}	ND - 140	140 ^c	7.5E-07	8.1E+01 ²	NO
1,1,1-TCA ^{‡‡}	ND - 4.3	4.3 ^a	2.5E-07	3.9E+03 ²	NO

[†] $\mu\text{g/L}$ = micrograms per liter; [‡] CV = Comparison Values; [¶] ND = non-detect;

[§] TCE = trichloroethylene; ^{**} PCE = tetrachloroethane; ^{††} 1,1-DCE = 1,1-dichloroethylene; ^{‡‡} 1,1,1-TCA = 1,1,1 trichloroethane.

a= 1996 sampling data; b= from sample WC-1, 1997 data; c= from sample WC-2, 1997 data.

1= ATSDR chronic EMEG; 2= ATSDR intermediate EMEG

Table from ATSDR (2000b).

Soil

Evidence of past soil contamination related to drainage system runoff from the TIAA site has been detected. This contamination was evaluated in previous public health assessments (ATSDR, 1988, 1996a, 2000a). As presented in the document subtitled "El Vado Residential Properties," (ATSDR, 2000a) remediation of these areas has occurred to below Residential Arizona Soil Remediation Levels (SRLs). SRLs are levels of contaminants in soils promulgated by administrative rule that do not represent a health risk. A summary table of representative soil data is presented as Table 2.

Other areas of contaminated soil related to AFP44 and the airport itself have either been remediated or are being remediated as part of ongoing TIAA site work (EPA, 2000). The AFP44 and airport property soil sites are completely fenced to restrict site access and the fencing is routinely monitored. Based on this restriction of access, ADHS finds no public health concern from on-site soil contamination because there currently is no completed pathway of exposure.

Table 2: Sample Results From Remediated Areas in El Vado Residential Area (1997)

Remediation Area	Number of Samples	Range of PCB Concentrations (mg/kg)	Mean (mg/kg)	SRL for PCBs (mg/kg)	Above SRL

AREA A: Drainage Area	12	0.643 - <0.033	0.32	2.5	NO
AREA B: Vacant Lot	9	0.182 - <0.033	0.100	2.5	NO
AREA C: Backyards of Residences	5	0.122 - <0.033	0.076	2.5	NO
AREA D1: Vacant Area North of the Church	3	0.120 - 0.045	0.07	2.5	NO
AREA D2: Vacant Area West of the Church	2	0.039 - 0.035	0.037	2.5	NO

Results from Conestoga (1997) as reported in ATSDR (2000a).

Water

Past Groundwater Conditions

As noted previously, insufficient data exist to evaluate groundwater contamination prior to 1981. Therefore, ADHS finds that pre-1981 groundwater exposure is an indeterminate public health concern.

Groundwater conditions since 1981 have been evaluated in previous public health reports (ATSDR, 1988, 1996a, 2000c). Summarizing these documents, ADHS finds that groundwater offsite was contaminated with trichloroethylene (TCE) at levels above public health guidelines prior to 1981. However, there have been no significant exposures since site monitoring and remedial activities began in 1981. A summary of past municipal well monitoring data is presented in Table 3.

Table 3. Maximum Contaminant Concentrations, Municipal Supply Wells Removed from Service.

Well	Month/Yr Removed from Use	TCE (ppb)	Sample Date (month/yr)
SC-007A	5/81	122	11/81
C-062B	6/81	126	5/82
C-064B	10/81	10	9/81
C-066A	8/83	9	8/83

C-072A	?/70	22	3/82
B-087A	11/81	43	5/82
B-101A	8/81	112	5/82
B-102A	10/78	239	5/82
MCL		5	

data source: ATSDR, 1996

MCL = current EPA drinking water standard (Maximum Contaminant Level)

Present Groundwater Conditions

Current groundwater data indicate that contaminated groundwater from the site is not being used as a drinking water source (ATSDR, 2000c). A summary of recent private drinking water well data is provided in Table 4. The site currently poses no apparent public health concern (ATSDR, 2000c) from exposure to groundwater.

Table 4: Maximum Contaminant Concentrations in 12 Private Drinking Wells and Comparison to Corresponding MCLs*.

Well ID #	Present Status	TCE [†] MCL=5 µg/L [‡]	Chromium MCL=100 µg/L	Above MCL?
25	Cemetery	N.D. [§]	N.D.	NO
28	Private residence	N.D.	N.D.	NO
29	Private residence	N.D.	N.D.	NO
3	Private residence	N.D.	2.2	NO
12	Mobile Home Park	N.D.	6.3 **	NO
9	Private residence	N.D.	3.0 **	NO
18	Private residence	N.D.	5.6 **	NO
21	Private residence	N.D.	5.8 **	NO
17	Private residence	N.D.	1.2 **	NO
7	Private residence	4 **	N.D.	NO
13	Mobile Home Park	3.6	5	NO
15	Private residence	3 **	6.3 **	NO

* MCLs = maximum contaminant levels; † TCE = trichloroethylene; ‡ µg/L = micrograms per liter; § N.D. = non-detect;

** Indicates an increase in contaminant level from 1994 samples to 1998 samples.

Table from: ATSDR, 2000c

Future Groundwater Conditions

No current private drinking water wells contain TCE at levels of concern at the site. However, contamination of a number of private irrigation water wells has been documented (ATSDR, 2000c). The presence of private irrigation wells contaminated with TCE and the possibility that these wells could be converted for drinking water use presents a potential public health concern. ADHS has recommended that safeguards be enacted to preclude private use of any contaminated irrigation well for drinking water purposes until site remediation has been completed (ATSDR, 2000c). ADHS affirms that recommendation in this current document.

4.2 Previous Public Health Reports and Findings

As noted previously, a number of public health evaluations have been conducted over the last several years regarding the Tucson International Airport Area superfund site. Some of the key reports are listed below along with a brief summary of their public health findings:

- ◇ Public Health Assessment for Tucson International Airport Site (ATSDR, 1988) - This report evaluated the (limited) available data and concluded that public drinking water supplies posed *no public health concern*. The report also found a lack of adequate information on previous conditions which left past conditions as an *indeterminate public health concern*.
- ◇ Baseline Human Health Risk Assessment (ADHS, 1996) - This document used formal risk assessment methods following EPA's "Risk Assessment Guidance for Superfund" and found that offsite soils posed a potential public health risk due to PCB contamination. These soils have since been remediated. No completed pathway of groundwater exposure was identified, and no risk was found from groundwater.
- ◇ Petitioned Public Health Assessment Addendum for Tucson International Airport Area (ATSDR, 1996a) - This document evaluated a large body of environmental data and found that groundwater and municipal drinking water posed *no apparent public health hazard*. Soils in wash areas were of *public health concern* based on the presence of polychlorinated biphenyls (PCBs). Note that the wash areas have since been remediated and were discussed in the document regarding the "El Vado Residential Properties" (ATSDR, 2000a).
- ◇ Public Health Assessment for Tucson International Airport Area (a/k/a El Vado Residential Properties) (ATSDR, 2000a) - This public health assessment evaluated off-site soil contamination west of the Tucson Airport property. The contamination was apparently the result of surface water runoff from the western portion of the airport near the three hangars area. ATSDR found that soils had been remediated to an acceptable level and the site posed *no public health hazard*.
- ◇ Public Health Consultation for Tucson International Airport (a/k/a West Cap Facility)

(ATSDR, 2000b) - This consultation evaluated specific concerns regarding soil contamination and soil gas vapors inside buildings on the former West-Cap property. Indoor air concentrations modeled from soil gas data were found to present *no public health hazard*.

- ◇ Public Health Assessment for Tucson International Airport Area (Plume B Area) (ATSDR, 2000c) - This PHA evaluated private wells in the Plume B area north of the airport. Twelve private drinking water wells were evaluated and were found to pose *no public health hazard*. In addition to private drinking water wells, a number of private wells used for irrigation purposes were also evaluated and three were found to contain TCE at levels above drinking water standards. Because it is possible to convert an existing irrigation well to a drinking water source or to install a new private well for drinking use in the area, this was considered to be a *potential public health concern for the future*. Actions to prevent any exposures of public health concern were recommended.

4.3 Health Outcome Data Evaluation

ATSDR and ADHS have reviewed the eight studies listed in Section 1.4. A brief summary of the findings of these studies is presented here. Readers are referred to the Public Health Assessment - "Plume B Area" (ATSDR, 2000c), the 1996 PHA Addendum (ATSDR, 1996a), or the specific study documents for more details about the findings and limitations of each study.

No statistically significant results were found for the following outcomes studied: a) homebound program admission rates in the Tucson Unified and Sunnyside school districts, b) mortality rates of Hughes aircraft employees, and, c) childhood leukemia and testicular cancer incidence in Pima County.

In the reviewed studies, the reported results were suggestive, but not conclusive, for the following outcomes: a) congenital heart disease, b) musculoskeletal birth defects (county-year interactions), c) mortality due to asthma, d) neuro-behavioral performance, and, e) prevalence of systemic lupus erythematosus.

In addition to these studies, ATSDR has conducted two additional activities pertinent to the trichloroethylene in groundwater at the TIAA site. First, ATSDR conducted a "Disease and Symptom Prevalence Survey" (ATSDR, 1996b) in an area around the site. In addition to the survey, ATSDR has developed a National Exposure Subregistry of persons significantly exposed to TCE at various locations in the US. The TCE Subregistry began in 1989 and is ongoing. The most recent report (ATSDR, 1999) covers data collected through 1997 and incorporates information collected from nearly 5000 persons.

The Disease and Symptom Prevalence Survey (ATSDR, 1996a) found "a statistically

significantly greater proportion of residents from the target area than the comparison area reported having had most of the general and neurological-specific disease and symptoms with onset since moving into the home occupied at the time of the survey.” The conclusions then note that “the association between the reported health outcomes and TCE exposure could not be determined without.....more detailed exposure information.”

ATSDR compares data from the TCE Subregistry to the National Health Interview Survey conducted throughout the US (ATSDR, 1999). In the information reported to date, TCE registrants reported some conditions at a higher rate than the general population. The health conditions reported in excess at one or more interview time periods were: anemia, diabetes, hearing impairment, hypertension, kidney disease, liver problems, skin rashes, speech impairment, stroke, and urinary tract disorders (ATSDR, 1999). ATSDR notes that these results do not identify a causal relationship between TCE exposure and adverse health effect because the excess reporting of some health conditions might be explained by methodological differences in data collection. ATSDR states it intends to continue the registry and follow-up evaluation (ATSDR, 1999).

4.4 Child Health Initiative

ATSDR’s Child Health Initiative recognizes that the unique vulnerabilities of infants and children demand special emphasis in communities faced with contamination of their water, soil, air, or food. Children are at greater risk than adults from certain kinds of exposures to hazardous substances emitted from waste sites and emergency events. They are more likely to be exposed because they play outdoors, they often bring food into contaminated areas, and the developing body systems of children can sustain permanent damage if toxic exposures occur during critical growth stages. ADHS has considered the special needs of children in the evaluation of the TIAA site.

5.0 Conclusions

Based upon the available data and previously published reports, ADHS has reached the following conclusions regarding the potential public health hazards posed by the Tucson International Airport Area (TIAA) superfund site.

Past Conditions

Since no groundwater sampling data exist for site related contaminants prior to 1981, the TIAA site posed an *indeterminate public health hazard* prior to 1981. Groundwater represented *no apparent public health hazard* after the contaminated municipal wells were closed.

Soils in wash areas were a potential public health concern due to the presence of polychlorinated biphenyls (PCBs) prior to the soil remediation activities conducted in 1996. However, after the clean up effort, the soils represented *no apparent public health hazard*.

Current Conditions

ADHS finds no current completed exposure pathways at levels of public health concern. The TIAA site currently poses *no apparent public health hazard*.

Future Conditions

ADHS notes that ongoing remedial activities should improve local environmental conditions. The potential currently exists for people to install private drinking water wells in currently contaminated groundwater. Because of this potential pathway, ADHS finds the TIAA site may pose *a potential public health hazard* unless further actions are taken. ADHS will share these findings with EPA site managers and parties responsible for the ongoing remedial activities in an effort to prevent any future public health hazard from occurring.

6.0 Recommendations

ADHS recommends the following for the TIAA superfund site:

- ◇ ongoing remedial efforts should continue at the TIAA site to reduce on-site contaminant levels; and
- ◇ actions should be taken to prevent potential future use of contaminated groundwater by private well users.

In the event additional data become available regarding the TIAA site, ADHS will consider modifying, or issuing an addendum to, this Public Health Assessment as appropriate.

7.0 Public Health Action Plan

ADHS has actively participated in regular site-related meetings with the local community (Unified Community Advisory Board - UCAB), regulatory agencies (EPA and ADEQ), and parties responsible for site remediation activities (AFP44, Tucson Airport Authority, contractors) to provide public health evaluations throughout the site investigation and remediation process. ADHS will continue to participate as needed in site related remedial activities to address public health concerns related to the TIAA site.

ADHS will also work to educate the local community about the use of private wells and health concerns that may be related to that use.

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Figure 1. General Map of Tucson International Airport Area Site and extent of contamination.

Figure 2. March 1999 Plume Outlines and TIAA Site Area.
Map from: Arizona Department of Environmental Quality, Southern Region Office

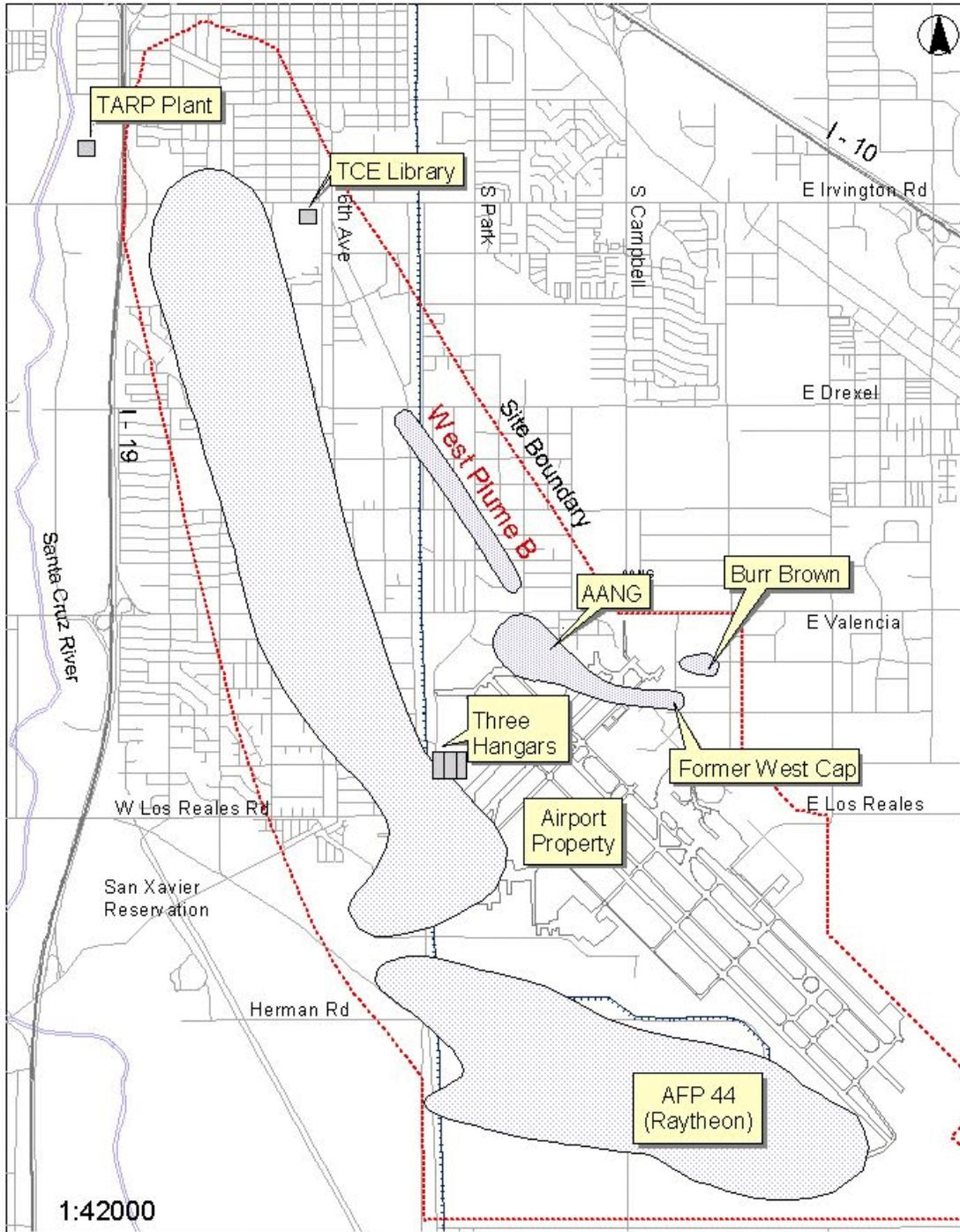


Figure 3. Demographics of Site Area, Tucson International Airport Area site.